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What Follows What?

Relations between Economic Indicators, Economic Expectations of the Public, and News on the General Economy and Unemployment in Germany, 2002–2011

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Abstract: This study aims to understand dynamic agenda building and agenda setting processes between real-world indicators, public expectations, and aggregated news on the general economy and unemployment for the four most popular general news outlets in Germany from 2002 to 2011: two public service, a commercial, and a tabloid news outlet. Vector autoregressive and Granger causality tests reveal that (1) news tone relates to real-world indicators, (2) public expectations for the general economy and unemployment are set by the tone of news on the general economy, especially during recession times, and (3) public expectations can forecast the future real-world economy.

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1. *Introduction*

Economic news not only *reports on* the economy but also *affects* its development. Public economic opinion such as consumer confidence is subject to media effects,[1] an early indicator of consumption[2] and of the economy.[3] The economy is a "permanently salient issue of the public discourse"[4] and news coverage. Yet few studies simultaneously consider dynamic agenda-building and agenda setting processes between economic news, public opinion, and the economy.[5]

This study aims to understand the relations between economic news coverage on news on the general economy and employment, changes in public expectations about the general national economic and unemployment developments, and the development of corresponding economic indicators. We ask the following research questions:

- Is the news set by public expectations and/or economic indicators?
- To what degree are public expectations set by the news?
- Are economic indicators forecast by the news and/or public expectations?

We address these questions by applying vector autoregressive (VAR) models to monthly time series data on the news tone, consonance, and volume of four most popular news outlets in Germany, public expectations, and economic indicators on the general state of the economy and unemployment for Germany from January 2002 to June 2011. Since time lags in agenda setting are expected to appear *within* quarters,[6] analysis on monthly frequency is applied.

This aggregate analysis approach combining secondary data assumes collective news effects on the public. According to the concept of collective media effects, news effects are repeated

by follow-up conversation to non-users and therefore media users and non-users develop similar economic expectations.[7]

2. *Literature Review*

Impact of Public Expectations and Economic Indicators on News Coverage. Economic news relies on real-world cues such as economic indicators or public opinion of the economy. Which of the two is more potent for news coverage has not yet been clarified.[8] Behr and Iyengar reveal that news coverage is more likely influenced by reality than by public opinion.[9] Later, Wu et al. support this result.[10] However, in periods with an economic downturn, public opinion can forecast economic news better than the real-world economy. In Blood and Phillips' study,[11] the effect of changes of public opinion on news on the general economy are reported across time. Here, during an upturn and a stable period, public opinion had an effect on news whereas leading economic indicators had no effect. Further, economic news is often characterized as negative.[12] Changes in news coverage are found to be asymmetric, favoring the coverage of negative economic developments.[13] Nadeau et al.[14] show that economic indicators (change in unemployment, change in inflation, the oil shock in 1979/80) and elite judgments have an impact on the news—and that the news interpret economic conditions. The dramatic event of the oil shock had an especially strong impact on news in their study. Also different affectedness of employment may cause different levels of news salience.[15] In the study by Starr,[16] consumer sentiment and the unemployment rate have a stronger forecasting ability for news than do other real-world indicators such as the Federal Funds rate, consumption, inflation and stock prices. However, Soroka[17] proves that very little unemployment news variation can be explained by the unemployment rate. He argues that a certain amount of noise,

the interests of the journalists and third parties as well as the salience of other issues may produce this result. Similarly, Nadeau et al.[18] discuss the idea that journalistic interpretation of real-word events may lead to weak relations between economic news and economic indicators. The news pattern in recession periods is an excessive increase of negative news caused by real-world developments. Journalists may act in a "regular mode," with greater interpretative autonomy, during non-recession periods that declines during recession periods. Hence, we ask the following.

RQ1: Do real-world indicators or public expectations forecast economic news coverage better during economic recessions than during non-recession periods?

Impact of News Coverage and Economic Indicators on Public Expectations. Although many researchers have revealed that news coverage influences people's agendas and views about the economy,[19] and traditional news media still affect the public agenda,[20] the public can also obtain economic information from their daily lives, experiencing real-world cues that supersede the influence of media coverage.[21] The obtrusive contingency hypothesis expects agenda-setting effects to decrease with personal experience of an issue. Media may set the agenda for abstract, unobtrusive topics.[22] Obtrusive topics are those that "people can have personal experience"[23] with and that relate to "events in their daily life."[24] Previous research a priori defines unemployment as an obtrusive issue, whereas the national gross domestic product (GDP) can be defined as either obtrusive or unobtrusive.[25] For national economic topics, indicators in people's lives such as the bustle on shopping streets or the construction activity in a city can influence economic sentiment. Still, only when the news reports about economic issues can these be grasped as social problem and expectations for the economic development in a

country be developed. For unemployment, Mutz[26] finds that personal experience affects the evaluation of the individual employment situation whereas, at a national level, economic news affects the evaluation of unemployment as a social problem. Hagen[27] argues that unemployment contains personal, egocentric (fear of losing one's job) and sociotropic (national problem) aspects, and finds that the news affects the perception of unemployment as an important *national* problem but is not likely to engender the fear that one will *personally* become unemployed. Yet both the general state of the economy and the increase in unemployment can affect personal life. Therefore, we understand the general state of the economy and national unemployment development as potentially *obtrusive* topics and expect the following according to the obtrusive contingency hypothesis.

H1: Real-world indicators forecast public expectations better than does news coverage.

National unemployment development is a lagging indicator of the economy, i.e., follows changes in the general economic situation.[28] Hence, when the public develops national unemployment *expectations* as opposed to current unemployment evaluation, the general state of the economy may be considered as well. Therefore, we test the following.

H2: An indicator on the general economy can better forecast public unemployment expectations than can unemployment numbers.

According to the concept of collective media effects, media users and non-users develop similar economic expectations though follow-up conversation.[29] Yet a high degree of news consonance across outlets is crucial to the measurement of collective news effects.[30] Hence, we test the interaction effect.

H3: The higher the news consonance, the stronger are news effects on public expectations.

Shehata and Strömbäck find no short-term agenda-setting effects for the perceived importance of unemployment as "important political issue today," and suppose that chronic accessibility due to high news salience prevents an effect.[31] However, Soroka[32] expects that media influence on the public decreases as unemployment increases since more people then have their own experiences with unemployment, i.e., obtrusiveness and the perception of an egocentric problem increases.[33] This is why personal experience creates similar economic expectations among media users and non-users.[34] Hence, we test the interaction effect.

H4: The higher the unemployment numbers, the smaller the effect of news coverage on public expectations.

During the financial crisis, economic news served as the dominant source for the public when it was almost impossible for people to accurately evaluate economic issues.[35] Wu and Coleman[36] and Hester and Gibson,[37] using the examples of presidential candidates and the economy respectively, show that negative information has a more powerful public agenda-setting effect than does positive information. Wu et al.[38] reveal that, in a recession, news has a stronger effect than the real economic situation on public expectations. More attention may be given to economic news during a recession to assess whether someone's own employment situation may be affected. As the need for orientation increases, the public pays more attention to economic news[39] and issue salience increases as a result.[40] Hence, we expect the following.

H5: News coverage forecasts changes in public expectations better during recessions than during non-recession times.

Impact of News Coverage and Public Expectations on Economic Indicators. Grossarth-Maticek and Mayr[41] find that counts of the word "recession" in German newspapers can somewhat forecast the German gross domestic product (GDP). This relation should be moderated by economic decision making, which is influenced by public opinion. Wu et al.[42] show that public sentiment from two to four months ago predicts economic performance. Therefore, both belief shocks[43] and self-fulfilling expectations[44] can move the economy. *Expectation-driven* business cycles explain changes in the economy through changes in economic expectations, which are caused by news shocks: "Empirically, news shocks about future productivity growth […] induce an expansion in aggregate consumption, investment, employment, output and stock prices."[45] Hence, false announcements of the macroeconomic development can affect economic growth.[46]

Iyengar and Kinder[47] argue that, when making decisions, recipients rely on those topics that are most salient to them. After establishing attitudes and expectations, these should affect intention and behavior according to the theories of reasoned action and planned behavior.[48] For example, TV evening news sentiment can predict private consumption.[49] This comprises the micro explanation of why consumer sentiment on the economy is considered an early indicator of the economy.[50] Therefore, we propose the following hypotheses.

H6: Public expectations can forecast indicators on the general state of the economy.

H7: A forecasting ability of public expectations on indicators on the general state of the economy is positively moderated by news coverage.

3. *Methodology*

The German Case. This study analyses economic news coverage by three television news shows and a newspaper with the largest audience in Germany, thereby representing Germany's pluralistic media structure. According to Hallin and Mancini,[51] the German media system belongs to the Northern European or democratic corporatist model, with high newspaper circulation compared with that of other countries. Nevertheless, the reach of daily newspapers has been decreasing since the 1990s, dropping to 44% in 2010 from 54% in 2000, whereas TV reached 86% (85%) of the German population in 2010 (2000).[52] In Germany, the quantity of economy news coverage in newspapers and TV has increased during the last two decades,[53] as it has in Europe generally.[54] Therefore, we consider German TV and newspaper media outlets a good European example for researching economic news.

The periods of the first quarter 2003 to the third quarter 2004 and the second quarter 2008 to the first quarter 2009 comprise recessions in Germany.[55]

News Outlet Selection. The news outlet with the largest audience in terms of reach (9.62 million and 9.14 million viewers in 2002 and 2011 respectively) is the major evening news show *Tagesschau,* a public service broadcast, followed by the major evening news show *heute* (5.17 million and 3.97 million viewers in 2002 and 2010 respectively), another public service broadcast.[56] During the observation period, the reach of a major commercial broadcaster's evening

news, *RTL aktuell* (3.89 million and 3.91 million viewers in 2002 and 2010 respectively[57]), exceeded that of *heute*. The fourth most important news outlet in terms of circulation is the commercial daily tabloid, *BILD*, whose circulation is in decline (4.05 million and 2.94 million in 2002 and 2010 respectively[58]).

The TV news shows provide general evening news. In the public service news shows, 70% of the content is dedicated to political and economic news.[59] About 40% of the commercial news show, *RTL aktuell*, consists of political and economic news, the rest consisting of sports, human interest or celebrity stories. *BILD* is not specialized in providing economic news and does not have a business news section but is a "prototypical representative of tabloid journalism."[60] Yet its news is found to influence economic sentiment.[61] Shehata[62] finds that TV news and tabloid newspapers display greater agenda-setting effects than other print media news.

Therefore, the news outlet selection covers the repertoire of many Germans and allows the disclosure of collective agenda-setting effects on aggregate level.

Data.

News Coverage. The news content data for public service and commercial broadcasters and the tabloid for the observation period from January 2002 to June 2011 (n = 114 months) are kindly provided by the research company Media Tenor. The unit of analysis is each print article and TV report on economic topics[63] referring to Germany on TV news shows and in the first three pages of the selected newspaper, since it does not hold a separate business news section. Except for the weather forecast, TV news shows are coded in their entirety. This study selects reports and articles dealing with the topics of national income, gross national product (GNP), GDP, the general economic situation, and economic growth for *news on the general*

economic situation (N = 4,152). *Employment news* comprises reports and articles on employment, unemployment, occupation, apprenticeships, labour force participation rate, the professional education system, and the professional qualification of the population (N = 4,806). Total observations on the general economy (employment) amount to 1,095 (1,148) for *Tagesschau*, 1,267 (1,100) for *heute*, 711 (996) for *RTL aktuell*, and 1,079 (1,562) for *BILD*.

Economic news coverage is measured using three variables: the average tone of all economic news reports—news tone (NT), the degree of news tone consonance as the inverse standard deviation of news tone—news tone consonance (NC: higher values reflect a more homogeneous NT), and the sum of all reports—news volume (NV) on the general economy and employment. NT and NC measure journalistic interpretation, NV measures journalistic selection. The data is aggregated as means (NT, NC) and sums (NV) per month for the four news outlets considered. To take the mean of NT assumes that the news outlets report similarly. Although news outlets differ from each other in levels of NT—especially the tabloid newspaper BILD employs more positive NT after 2007 compared with TV news—NT and NC of the news outlets share common trends over time, i.e., are cointegrated.[64] Therefore, and because of the goal to reveal collective news effects, we consider taking the mean of NT and NC over the four selected news outlets to be useful.

NT is coded as positive (1), neutral (0), or negative (-1). Only predominantly judgmental statements or descriptions of actors or situations by journalists, concerned parties, adversaries, or independent actors such as politicians, business people or scientists lead to positive or negative NT coding. NT is coded as positive when explicitly positive terms are mentioned, such as *good, excellent,* or *promising* or the topic is embedded in an implicitly positive context, such

as *decreasing unemployment figures* or *company profits*. If no predominant positive or negative tendencies are identifiable, the article or report is coded as neutral. The means of NT and NC are -.18 and .56 (-.28 and .48) for the news on the general economy (employment) over the observed 114 months, revealing a slightly negative level with rather strong deviations.

The coding of economic news is carried out on original print copy and broadcasts by professionally trained, full-time coders at Media Tenor. Every coder must pass a validity test with a minimum score of 87% before analyzing media content. Intercoder reliability is continuously tested with Krippendorff's alpha, at the level of the article or report (i.e., main topic), reference objects (e.g., companies), and the statement. At every level, intercoder reliability is maintained at a minimum of 87%.[65] Media Tenor data are often used in academic research.[66]

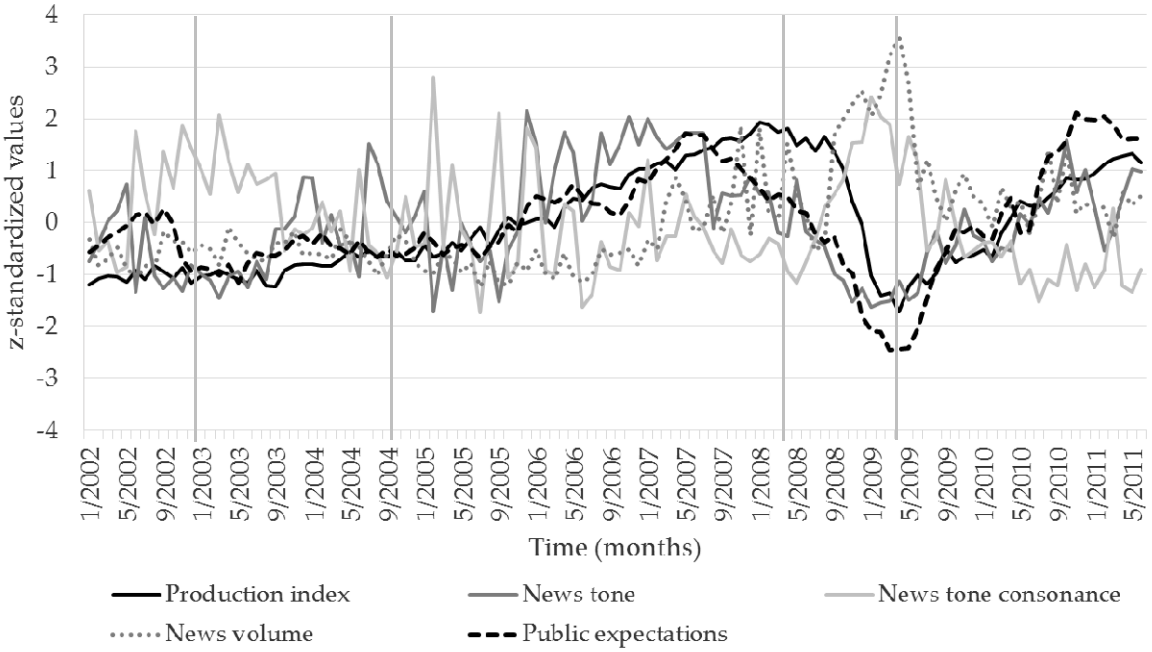
Economic Indicators. We use the industrial production index and the unemployment rate from the German Federal Statistical Office as economic indicators (EI). The industrial production index is available monthly, whereas the GDP is available only quarterly. Yet industrial production is closely related to the GDP in Germany. Therefore, the industrial production index can be considered as indicating the general state of the economy and has been widely used in monthly analyses.[67] On average, 8.9% of the German population had personal experience of unemployment within the observation period with a maximum of 11.5% in 2005. After the severe 2008/9 recession, the unemployment rate tops 8% in mid-2009. Both real-world indicators are seasonally adjusted. The industrial production index is also working-day adjusted.

Public Expectations. Public expectations (PE) concerning the general state of the economy and unemployment expectations are obtained from the monthly consumer survey of the European Commission. This survey has been conducted in the European Union Member States and candidate countries by partner institutes on behalf of the European Commission according to a commonly agreed methodology since 1961.[68] The consumer survey is comparable to the University of Michigan Consumer Sentiment Survey for the United States. For this survey, 2,000 respondents among the German population older than 14 years are polled through in-home, computer-assisted face-to-face interviews during the first two weeks of every month. Sampling is stratified by gender, age, occupation, household size, federal region, and community size. The sampling error has a confidence level of 95% and the error for a 10% share is +-1.3%.[69] The question used to determine public opinion on the expected development of the general state of the economy is, "How do you expect the general economic situation in this country to develop over the next 12 months?"[70] The question used to determine public opinion on unemployment expectations is, "How do you expect the number of people unemployed in this country to change over the next 12 months?"[71] The answers are given on a five-point ordinal scale (and a don't know category (N)): The economic situation will..."get a lot better" (PP), "get a little better" (P), "stay the same," (E) "get a little worse" (M) or "get a lot worse" (MM); employment will..."increase sharply" (PP), "increase slightly" (P), "remain the same," (E) "fall slightly" (M) or "fall sharply" (MM). On the basis of the distribution of the answer options for each question, the European Commission calculates balances (B) ranging from -100 to +100 on the basis of weighted averages as B = (PP + ½P) – (½M + MM) where PP + P + E + M + MM + N = 100 (N is the percentage of respondents without any opinion). The

balances are seasonally adjusted. Hence, the public expectation indicators are a measure of the average *and* the frequency of opinions.

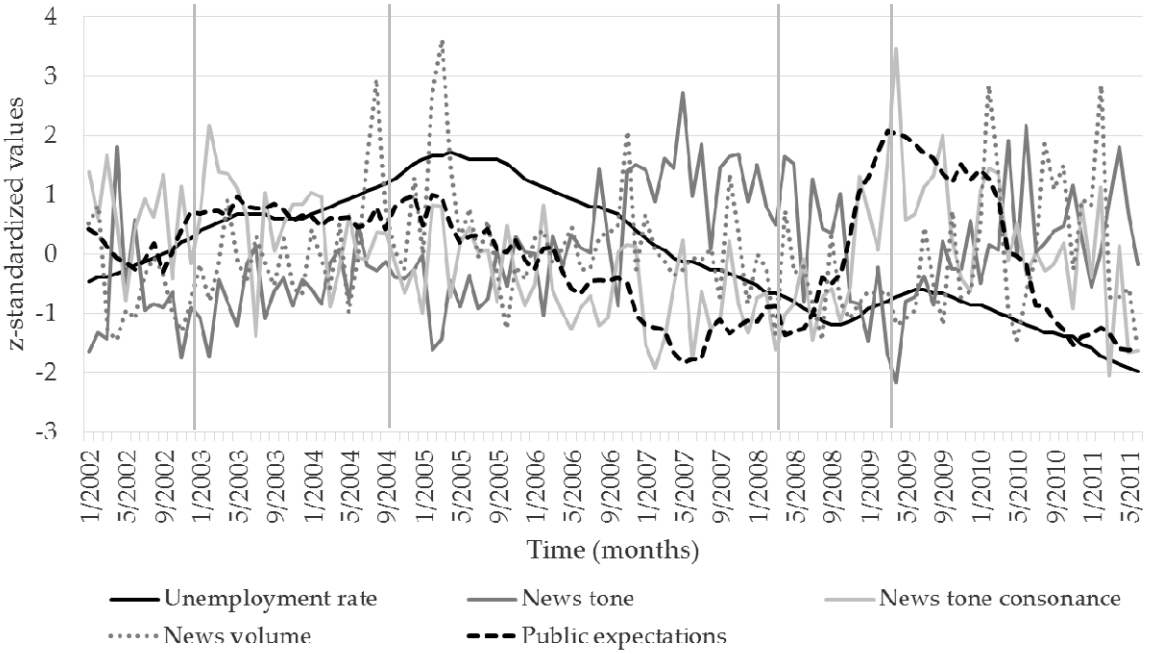
Figures 1 and 2 plot EI, PE, NT, NC, and NV, for the general economy and for employment respectively, against time. For equivalent display and analysis, all data standardized by z-transforming are therefore mean-centered to zero.

Figure 1: Production index, news on the general state of the economy, and public expectations for the general state of the economy



Note. All data are z-transformed. The recession periods (Q1 2003 to Q3 2004; Q2 2008 to Q1 2009) are marked. NT, NC, and NC of news on the general economic situation are displayed (N = 4,152). Public expectations refer to the question "How do you expect the general economic situation in this country to develop over the next 12 months?"

Figure 2: Unemployment rate, news on employment and public expectations for unemployment



Note. All data are z-transformed. The recession periods (Q1 2003 to Q3 2004; Q2 2008 to Q1 2009) are marked. NT, NC, and NV of news on employment are displayed (N = 4,806). Public expectations refer to the question "How do you expect the number of people unemployed in this country to change over the next 12 months?"

Measurement. The temporal relation between economic indicators, news coverage, and public expectations is estimated using VAR modeling[72] and Granger causality.[73] The VAR approach is to write a symmetrical system of equations that allows dynamic and interdependent analyses between the variables of interest.[74] A VAR model including the past of the dependent and independent variables of the form

(1a) $\Delta Y_t = \alpha_1 + \beta_1 \Delta Y_{t-n} + \lambda_1 \Delta X_{t-n} + \varepsilon_{1t}$

(1b) $\Delta X_t = \alpha_2 + \lambda_2 \Delta X_{t-n} + \beta_2 \Delta Y_{t-n} + \varepsilon_{2t}$

is applied to the data, where α is the constant, β_1 and λ_2 are the autoregressive coefficients of the dependent variable, λ_1 and β_2 are the coefficients of the independent variable, and ε is the error term. With VAR models, a variable is described as a result of its own past and that of

other variables. Granger causality is based on VAR models and tests whether a variable can be better predicted by using the past (lags) of another variable instead of just its own. This concept is therefore not causal but explores lead–lag relations or forecasting qualities. After each VAR model is estimated, Granger causality tests are used to determine whether X_{t-n} helps forecasting Y_t (1a). In addition, the sign (+/-) of the VAR coefficients reveals whether the relation is positive or negative. This VAR procedure follows recent research on the relations between the "reality", media content, and public opinion.[75]

In time series modeling it is crucial that the data fulfill the condition of (weak) stationarity to avoid spurious correlations, a low Durbin-Watson d-statistic revealing autocorrelated residuals, a high R^2, and high significance of the coefficients.[76] The commonly used augmented Dickey–Fuller (ADF) test is performed to detect the unit roots and the Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test is used to assess trends and level stationarity for each time series. The variables, public opinion and economic indicators, contain trends and drifts, especially around 2009 during the financial crisis (see Figures 1-2) and are non-stationary. NT, NC, and NC are stationary according to ADF and KPSS.[77] To eliminate the trend from the non-stationary series and achieve mean stationarity, the common method used is differencing.[78] Differentiated time series of order one ($Y_t - Y_{t-1}$, Δ) for PE and EI are tested as stationary according to ADF and KPSS tests. Therefore, the analysis is executed based on *changes* (Δ) in the current month (t) compared with the previous month (t-1) for PE and EI and based on *levels* in the current month (t) for NT, NC, and NV. This approach is similar to that of Soroka's media content time series.[79] For the interaction terms, products of non-standardized data are calcu-

lated and afterwards z-transformed. For NTxNC (PExNC), a higher consonance should reinforce and a lower consonance should weaken NT (PE) values. Therefore, NC is computed as (1+mean(stdevNT)) – stdevNT so that the new mean of NC is 1. For PExNT (EIxNT), negative PE (EI) and negative NT inverts PE (EI) to in positive interaction values whereas positive NT weakens negative PE (EI).

The appropriate lag order of the model is selected by using Akaike's information criterion and Wald lag exclusion statistics. All VAR models satisfy the Eigenvalue stability condition. For testing separate effects of the recession periods 2003/4 and 2008/9, the variables are set to zero (mean) during the remaining periods. This procedure allows the analysis of the complete observation period without break while absorbing (non-)recession effects. Since the autocorrelation or a non-white noise process of the residuals $\varepsilon\hat{}$ can lead to misinterpretation of the relation between variables, Durbin–Watson and Portmanteau tests are performed.

4. *Findings*

Impact of Economic Indicators and Public Expectations on News Coverage. For RQ1, we ask whether real-world EI or PE better forecast news coverage (NT, NC, NV) in recessions or non-recession periods. Table 1 shows that NT of *news on the general economy* is barely set by the corresponding EI or PE but depends strongly on NT of the previous month (column 1, *t*-1+***). The negative signs of the EI coefficients reveal that the more positive the economic development is, the less consonant is NT and vice versa (column 2). The more negative PE was two months ago (column 3, *t*-2–**, t-2–*), the more NV is published now. NT and NC of *news on employment* strongly depend on past unemployment numbers. The more unemploy-

ment there is, the more negative and consonant is NT (column 4). With decreasing unemployment, NT also becomes less consonant, as the positive signs of the EI coefficients reveal (column 5). During the 2008/9 recession, negative PE forecast a more positive NT indicating that PE and NT were not in alignment (column 6). Yet NV can be forecast neither by unemployment numbers nor by corresponding PE but by the NV on the general economy (column 7): The more news there is on the general economy, the less employment news there is in the subsequent month (*t*-1–**). The unemployment news tends to be caught up one month later (*t*-2+°). Hence, journalistic interpretation (NT, NC) depends more on EI than on PE. Only journalistic selection (NV) of news on the general economy is partly related to previous changes in PE.

Impact of News Coverage and Economic Indicators on Public Expectations. Table 2 shows results for public expectations being the dependent variable. Variables and interaction terms are added to the models step by step. As indicated by Granger causality and the level of significance of the coefficients, EI on the general state of the economy can better forecast PE for the general economy (H1) *and* even better on unemployment (H2) than can NT, NC, or NV for the total observation period (models 1 and 1'). When the production index increases, PE for the general economy will become more optimistic (*t*-3+*), and a decrease in unemployment is expected (*t*-1–**, *t*-3–*). Yet changes in real-world unemployment numbers cannot forecast public unemployment expectations (models 1 and 2). Therefore, we accept H1 in part and H2 in full.

The interaction effect between NT and NC shows a negative sign of the coefficient for PE for the general economy (model 2). Hence, the less consonant it is, the more NT tends to affect PE

for the general economy. However, this interaction effect is not significant for unemployment expectations. Therefore, we do not accept H3.

We also find no support for H4 stating that the higher the unemployment numbers, the smaller the effect of news on PE. But NT effects tend to increase with higher unemployment numbers (unemployment, model 2, row NTxEI, *t*-2+°,). This effect is not significant in other models.

Model 3 relates to H5 and reveals that EI of three months ago tends to forecast PE on the general economy in non-recession times whereas NT of the previous month tends to forecast PE in the 2008/9 recession. This NT effect increases with higher NV (model 4, *t*-1+**). Unemployment numbers positively forecast and Granger cause public unemployment expectations in non-recession times and the weaker 2003/4 recession (model 3). Employment NT can forecast PE on national unemployment in all periods—but the more negative the NT, the less unemployment the public expects. Also the tone of news on the general economy (model 3'') cannot forecast the public unemployment expectations in the expected direction in the 2003/4 recession (*t*-3+*) but can do so to some degree in the 2008/9 recession (*t*-1–*).To sum up, PE were not set by EI during the severe 2008/9 recession. Only NT for the general economy of the previous month can forecast both PE for the general economy and for unemployment during the 2008/9 recession in the expected direction. Therefore, we accept H5 in part.

The role of NV is tested directly in model 1 for the general economy and unemployment, revealing that more news leads to more optimistic PE for the economy and the expectation of a decrease in unemployment numbers. The interaction effect of NT and NV reveals that the

NT effect on the PE for the general economy tends to increase with higher volume (models 2 and 4, row NTxNV, *t*-1+*, *t*-1+**).

Concerning the quality of the models, PE models for the general economy fit better according to the *F* value and Portmanteau test. An explained variance (adjusted R^2) up to 30% can be reached when including interaction terms. However, it is not sufficient to explain national unemployment expectations with unemployment numbers or the production index and unemployment news or news on the general economy as adjusted R^2 remains low.

Impact of News Coverage and Public Expectations on Economic Indicators. The results in Table 3, model 1, reveal that PE on the general economy positively forecast the production index. According to the sign of the PE coefficient, more optimistic PE one month earlier Granger causes an increase in the production index now (*t*-1+** (3.842***)). Therefore, we accept H6. In contrast, unemployment expectations are not found to have the capacity to forecast employment numbers.

News coverage has no direct unconditional effect on the production index in model 1. To add interaction terms between PE and news coverage improves the model quality (model 2). Interaction terms reveal that the forecasting ability of PE for the production index tends to decrease with less consonant NT (*t*-3–°) and less NV (*t*-2–*). When public expectations are on average lower, NC tends to forecast a more positive economic development in the next quarter (t-3–°). Hence, news coverage is not positively related to the production index. Therefore, we reject H7.

5. *Discussion*

This study compares economic news coverage by major German news outlets with real economic indicators and public economic expectations. First, the interpretation of economic news is mainly set by changes in economic indicators and rarely by public expectations confirming previous research.[80] A more negative economic development tends to lead to a more negative and more consonant NT. By the same token, the more positive the economic development, the less consonant the NT. The fewer unemployed people there are, the more positive is employment news—but the less consonant it is, as well. That is, news interpretation is more consistent in downturns and less consistent in upturns—which may be caused by asymmetric responses to negative events by journalists.[81] Economic indicators are not explicitly stronger drivers of news during recessions, but public expectations are. NV concerning the general economy was clearly forecast by public expectations for the economy during the 2008/9 recession. Hence, general economic NV did not respond in a "fire alarm" fashion to warn the public,[82] but public opinion did herald increased NV. The increase of news on the general economy leads to a decrease in the unemployment NV. In line with Soroka[83] we argue that a certain amount of noise and the salience of the issue of the general economy produce this result. Also, the development of news coverage is much more volatile than the development of real-world economic indicators and public expectations, indicating that journalistic selection and interpretations are versatile and voluminous and do not represent solely the economic development on aggregate level.

Second, public economic expectations are more influenced by economic indicators than by news coverage supporting the obtrusive contingency hypothesis. Yet the effects of NT increase with greater NV instead of NC. In the 2008/9 recession, NT concerning the general economy positively forecast public expectations for the general economy and, more clearly, unemployment expectations. This is in line with findings revealing stronger agenda-setting effects during recessions[84] or for negative news.[85] The public concludes that unemployment increases as a result of a declining general economic situation. An increase in employment NV also forecasts more pessimistic unemployment expectations. This relates to the results of Golan and Wanta,[86] who show that news volume is a stronger predictor of public opinion than tone.

Public expectations for the general economy are explained by the corresponding economic indicator and news coverage. During stable economic times and the less severe 2003/4 recession, decreasing unemployment numbers and an improving general state of the economy forecast a decrease in national unemployment expectations. A previous study that fails to reveal short-term agenda-setting effects for unemployment in Sweden explains that the lack of agenda setting is due to constant high news coverage over the years.[87] This situation—in which the public may be oversaturated with news on unemployment—may prevent news from having an effect on the public's unemployment expectations even in the present study. If unemployment is regarded as a more obtrusive topic than the general economy, a lack of agenda-setting effects can be explained according to the obtrusive contingency hypothesis. However, this study suggests another explanation. Unemployment expectations are devel-

oped based on preceding economic indicators and news such as on the general economy. Another explanation lies in the inability of aggregate data analysis to link public opinion with media usage on a micro level of the individual. Although collective media effects can be expected and the selected news outlets are the most popular in Germany and news media are found to be the most important information sources for audiences on the general state of the economy,[88] not all economic actors receive economic news with the same frequency, nor do they receive the same economic news.

Third, as expected, public expectations for the general economy forecast the real-world economic development whereas news does not have an unconditional direct effect. This result supports the finding of Wu et al.,[89] revealing that public expectations forecast economic performance. Two explanations are possible for this forecasting ability. Either, the public makes correct assumptions about developments in the economy. Or, the public influences the economy via economic decision making. The latter would support the concept of expectation-driven business cycles explaining changes in the economy through changes in economic expectations. However, the influence of public opinion on a change in the production index is very short term—only one month in the present study. Unemployment expectations are not found to have the capacity to forecast employment numbers. Because the employment situation is experienced by the population directly and is a result of the state of the economy, since it is a lagging indicator,[90] public expectations may not influence employment numbers, since the employment situation cannot be changed by media coverage or attitudinal or behavioral changes in the audience but is, instead, a result of the state of the economy. Further research

could include actual decision making of the public, such as consumption decisions, to clarify whether the public correctly anticipates or influences economic development.

In conclusion, first, economic news are a result of the interpretation of noisy real-world developments. Journalistic interpretation on economic issues is related to but goes beyond aggregate economic indicators. More narrow news issue selection or more specialized news outlets might reveal closer relations between news coverage and economic indicators. Second, people are more likely to use information gathered from their daily lives to develop economic sentiment than information gathered from the general news. High NV instead of NC is a condition for stronger NT effects. Hence, second-level agenda-setting effects depend on news quality and quantity. Third, public unemployment expectations also depend on news on the general economy. Therefore, the public correctly anticipates the unemployment development in the future.

Table 1: Impact of economic indicators and public expectations on news coverage

	News coverage						
	General situation of the economy			Employment			
Dependent variable	NT	NC	NV	NT	NC	NV	NV
Past NT/NC/NV	*t*-1+***, *t*-2+°	*t*-1+**	*t*-1+***, *t*-2+**	*t*-2+*	*t*-1+*	*t*-1+*	*t*-1+*
Δ EI 2003/04	n.s. (–) (2.532°)	*t*-2–° (n.s.)	n.s. (n.s.)	*t*-1–° (5.340**)	*t*-1+* (4.582*)	*t*-1+° (n.s.)	n.s. (n.s.)
Δ EI 2008/09	n.s. (n.s.)	*t*-1–*, *t*-2–* (4.617*)	n.s. (n.s.)	*t*-1–* (5.362**)	*t*-1+* (4.446**)	n.s. (n.s.)	n.s. (n.s.)
Δ EI no recession	*t*-1+° (n.s.)	*t*-1–°, *t*-2–° (3.757*)	n.s. (n.s.)	*t*-1–° (8.308***)	*t*-1+* (7.041**)	n.s. (n.s.)	n.s. (n.s.)
Δ PE 2003/04	*t*-1+* (n.s.)	n.s. (n.s.)	n.s. (n.s.)	n.s. (n.s.)	n.s. (n.s.)	n.s. (n.s.)	n.s. (n.s.)
Δ PE 2008/09	n.s. (n.s.)	n.s. (n.s.)	*t*-2–** (3.492*)	*t*-1–* (2.80°)	n.s. (n.s.)	n.s. (n.s.)	n.s. (n.s.)
Δ PE no recession	n.s. (n.s.)	n.s. (n.s.)	*t*-2–* (2.171°)	n.s. (n.s.)	n.s. (n.s.)	n.s. (n.s.)	n.s. (n.s.)
NV on the general economy							*t*-1–**, *t*-2+° (4.712*)
Constant	–0.008	0.045	0.012	–0.037	0.031	0.010	0.010
Lag structure	*t*-1, *t*-2	*t*-1, *t*-2	*t*-1, *t*-2, *t*-3	*t*-1, *t*-2	*t*-1, *t*-2	*t*-1, *t*-2	*t*-1, *t*-2
n	111	111	110	111	111	111	111
Adjusted R^2	0.546	0.262	0.715	0.425	0.298	0.108	0.172
F	10.266***	3.672***	13.793***	6.674***	4.227***	1.859*	2.341**
RMSE	0.684	0.872	0.543	0.749	0.834	0.952	0.917
Durbin–Watson *d*–statistic	2.081	2.079	2.088	1.863	2.006	1.962	2.018
Portmanteau test for white noise (*Q*)	30.927	35.916	41.733	43.497	33.642	26.736	29.347

Note. Δ: first differences, otherwise levels. Cells contain the lags and signs of significant VAR coefficients with Granger causality *F* value in parentheses. For Granger causality, the null hypotheses that the coefficients on all the lags of an endogenous variable are jointly zero is tested. n.s.: not significant, °: significant on 10% level, *: significant on 5% level, **: significant on 1% level, ***: significant on .1% level. EI for general economy is the production index, EI number for employment is the unemployment rate, PE question for the general economy: "How do you expect the general economic situation in this country to develop over the next 12 months?," PE question for employment: "How do you expect the number of people unemployed in this country to change over the next 12 months?"

Table 2: Impact of economic indicators and news coverage on the public expectations for the general economy and national unemployment

Dependent variable	Public expectations (PE) on the general economy				Public expectations (PE) on national unemployment						
Model	1	2	3	4	1	1'	2	3	3''	4	4''
Δ Past PE	*t*-1+°	*t*-3+°	*t*-1+°	*t*-1+*	*t*-3+°	n.s.	n.s.	*t*-3+*	*t*-2–°	n.s.	n.s.
Δ EI 2002–11	*t*-3 +* (2.942°)	*t*-3 +*			n.s. (n.s.)	*t*-1–**, *t*-3–* (4.400**)	n.s. (n.s.)				
Δ EI 2003/04			n.s. (n.s.)	n.s. (n.s.)				*t*-1+° (3.142*)	*t*-1–*, *t*-3–° (2.169°)	*t*-2+° (3.414*)	n.s. (n.s.)
Δ EI 2008/09			n.s. (n.s.)	n.s. (n.s.)				n.s. (n.s.)	*t*-1–* (n.s.)	*t*-2+° (n.s.)	n.s. (n.s.)
Δ EI no recession			*t*-3+° (n.s.)	*t*-3+* (2.170°)				*t*-1+° (3.338*)	*t*-1–*, *t*-3–° (2.708*)	*t*-2+° (3.424*)	*t*-1–° (n.s.)
NT 2002–11	*t*-1+°, *t*-3–° (n.s.)	n.s. (n.s.)			n.s. (n.s.)	n.s. (n.s.)	n.s. (n.s.)				
NT 2003/04			n.s. (n.s.)	n.s. (n.s.)				*t*-2+* (n.s.)	*t*-3+* (n.s.)	n.s. (n.s.)	n.s. (n.s.)
NT 2008/09			*t*-1+° (n.s.)	n.s. (n.s.)				*t*-3+* (n.s.)	*t*-1–*, *t*-3+° (n.s.)	n.s. (n.s.)	n.s. (n.s.)
NT no recession			n.s. (n.s.)	n.s. (n.s.)				*t*-2+* (2.097°)	n.s. (n.s.)	n.s. (n.s.)	n.s. (n.s.)
NC 2002–11	*t*-3–° (n.s.)	n.s. (n.s.)		n.s. (n.s.)	n.s. (n.s.)	n.s. (n.s.)	n.s. (n.s.)			n.s. (n.s.)	*t*-2–° (n.s.)

NV 2002–11	*t*-3+*	n.s.		n.s.	*t*-1–*	*t*-1–*	*t*-1–°			n.s.	n.s.
	(n.s.)	(n.s.)		(n.s.)	(2.680°)	(2.169°)	(n.s.)			(n.s.)	(n.s.)
NTxNC 2002–11		*t*-3–°		n.s.			n.s.			n.s.	n.s.
		(n.s.)		(n.s.)			(n.s.)			(n.s.)	(n.s.)
NTxNV 2002–11				*t*-1+**,							
		t-1+*		*t*-2–°			n.s.			n.s.	n.s.
		(2.828°)		(5.172**)			(n.s.)			(n.s.)	(n.s.)
NTxEI 2002–11		n.s.		n.s.			*t*-2+°			n.s.	n.s.
		(n.s.)		(n.s.)			(n.s.)			(n.s.)	(n.s.)
Constant	0.001	0.004	–0.001	–0.038	0.005	0.002	0.008	0.017	–0.008	0.013	–0.001
Lag structure	*t*-1, *t*-3	*t*-1, *t*-3	*t*-1, *t*-2, *t*-3	*t*-1, *t*-2, *t*-3	*t*-1, *t*-2, *t*-3	*t*-1, *t*-2, *t*-3	*t*-1, *t*-2, *t*-3	*t*-1, *t*-2, *t*-3	*t*-1, *t*-2, *t*-3	*t*-1, *t*-2, *t*-3	*t*-1, *t*-2, *t*-3
n	110	110	110	110	110	110	110	110	110	110	110
Adjusted R^2	0.194	0.312	0.098	0.238	0.132	0.194	0.176	0.153	0.170	0.139	0.092
F	3.480***	3.815***	1.500°	1.891*	2.017*	2.650**	1.871*	1.873*	1.993*	1.440°	1.263
RMSE	0.249	0.230	0.264	0.243	0.251	0.242	0.245	0.248	0.245	0.250	0.257
Durbin–Watson *d*–statistic	2.032	2.020	2.051	2.117	2.072	2.012	2.137	2.128	1.963	2.098	1.995
Portmanteau test for white noise (*Q*)	41.492	32.782	42.578	29.168	59.059*	75.857***	62.151	40.749	64.684**	43.362	89.311***

Note. ': EI = real-world economic indicator production index. '': EI = real-world economic indicator production index and NT, NC, NV = news on the general economy, Δ: first differences, otherwise levels. Cells contain the lags and signs of significant VAR coefficients with Granger causality *F* value in parentheses. For Granger causality, the null hypothesis that the coefficients on all the lags of an endogenous variable are jointly zero is tested. n.s.: not significant, °: significant on 10% level, *: significant on 5% level, **: significant on 1% level, ***: significant on .1% level. PE question for the general economy: "How do you expect the general economic situation in this country to develop over the next 12 months?" PE question for employment: "How do you expect the number of people unemployed in this country to change over the next 12 months?"

Table 3: Impact of news coverage and public expectations for economic indicators

Dependent variable	Economic indicator (EI)			
	Production index		Unemployment rate	
Model	1	2	1	2
Δ Past EI	*t*-3+°	n.s.	*t*-1+***, *t*-2+**	*t*-1+***, *t*-2+*
Δ PE 2001–11	*t*-1+**	n.s.	*t*-1+°	*t*-1+*
	(3.842*)	(n.s.)	(n.s.)	(n.s.)
NT 2002–11	n.s.	n.s.	n.s.	n.s.
	(n.s.)	(n.s.)	(n.s.)	(n.s.)
NC 2002–11	n.s.	*t*-3–°	*t*-2–°	n.s.
	(n.s.)	(n.s.)	(n.s.)	(n.s.)
NV 2002–11	n.s.	n.s.	n.s.	n.s.
	(n.s.)	(n.s.)	(n.s.)	(n.s.)
PExNT 2002–11		n.s.		*t*-3+°
		(n.s.)		(n.s.)
PExNC 2002–11		*t*-3–°		n.s.
		(n.s.)		(n.s.)
PExNV 2002–11		*t*-2–*		n.s.
		(n.s.)		(n.s.)
Constant	0.012	0.022	–0.004	–0.003
Lag structure	*t*-1, *t*-2, *t*-3	*t*-1, *t*-2, *t*-3	*t*-1, *t*-2, *t*-3	*t*-1, *t*-2, *t*-3
n	110	110	110	110
Adjusted R^2	0.136	0.203	0.651	0.651
F	2.060*	2.090**	14.340***	9.325***
RMSE	0.210	0.202	0.044	0.044
Durbin–Watson *d*–statistic	1.959	1.881	2.011	2.084
Portmanteau test for white noise (*Q*)	40.579	31.699	29.809	38.117

Note. Cells contain the lags and signs of significant VAR coefficients with Granger causality *F* value in parentheses. For Granger causality, the null hypothesis that the coefficients on all the lags of an endogenous variable are jointly zero is tested. n.s.: not significant, °: significant on 10% level, *: significant on 5% level, **: significant on 1% level, ***: significant on .1% level. EI for general economy is the production index, EI number for employment is the unemployment rate, PE question for general economy: "How do you expect the general economic situation in this country to develop over the next 12 months?," PE question for employment: "How do you expect the number of people unemployed in this country to change over the next 12 months?"

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